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Read Abstract

It's a Project-Based World

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When it comes to building the ideal graduate, project-based learning lays a strong foundation.

If you ask a group of teachers, administrators, and other educators to describe the characteristics of an ideal graduate from the K–12 system, you'll get a remarkably similar list no matter where you are. The same goes for a group of parents, businesspeople, community members, and other stakeholders in the system. We know because we've done this exercise in hundreds of PBL 101 workshops conducted by the Buck Institute for Education. Our partner schools and districts have done it in their communities, too, and the graduate's profile typically looks like this every time: a responsible, resourceful, persistent critical thinker who knows how to learn, works well with others, is a problem solver, communicates well, and manages time and work effectively.

Similar traits are mentioned in discussions about what's needed for success in college. One major study (Conley, 2005) found that, in addition to subject-area knowledge and the habits of mind listed above, the ideal graduate is also "open to possible failure at times," "can weigh sources for importance and credibility," and is "open to and utilizes critical feedback."

When employers weigh in on what they think it takes to succeed in the workplace, it's pretty much the same list with the addition of the abilities to "innovate and be creative" and "apply knowledge and skills to real-world settings" (Hart Research Associates, 2013).

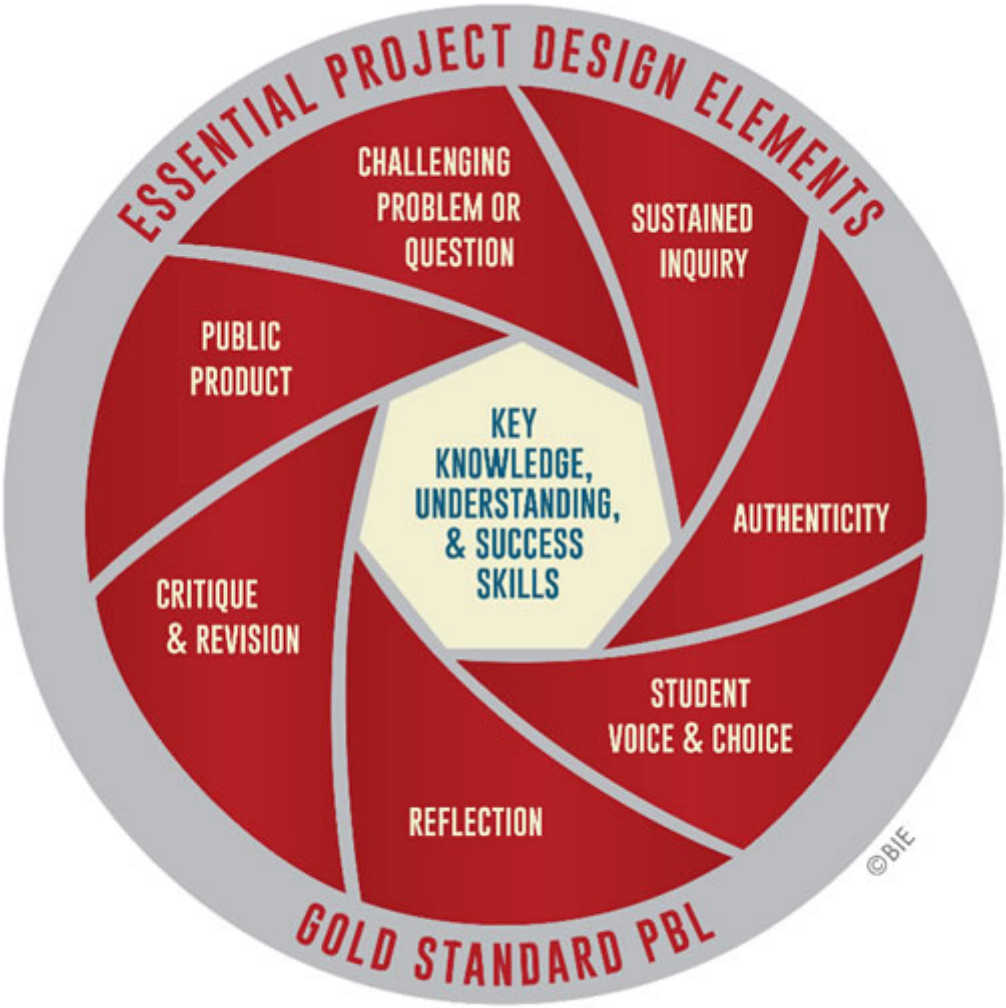
How Projects Build Success Skills

Although traditional classroom instruction might produce some of these skills and habits, this type of learning is typically inconsistent and disjointed—or gained as a side effect. It's much more powerful to place students directly in situations that call for these qualities. By experiencing rigorous project-based learning (PBL)—not just occasionally, but many times over the course of their school careers—students will be better prepared for college, careers, citizenship, and life in general. When it comes to tasks that we often undertake on the job or in our personal lives, from planning a trip to improving our homes, we're basically talking about a project.

In our model for gold-standard PBL (see fig. 1), we use the phrases "success skills" and "key knowledge and understanding" to describe the targeted learning goals in every high-quality project (Buck Institute for Education, 2015). Some success skills may be targeted explicitly, such as when a teacher intentionally provides scaffolding

for students' critical-thinking skills and assesses them with a rubric. Habits of mind, such as taking responsibility or persistence, may not be explicitly scaffolded or assessed, but students can be asked to reflect on how they are developing such traits.

Figure 1. Elements of Gold Standard Project-Based Learning



Consider what happens in a typical project that has been carefully planned and skillfully managed by the teacher, as described in our model. First, students are presented with an authentic, challenging problem or question that is novel, complex, and open-ended. They size it up and identify what they need to know to successfully complete the task. With guidance from the teacher, students find resources to help answer their questions and evaluate the quality and adequacy of the information they're gathering.

As students develop their own answers to the question and create a product that demonstrates what they've learned, they engage in iterative cycles of critique and revision. Sometimes their ideas fail, and they must return to the drawing board. Much of the work is done in teams, and students communicate their findings to a public audience. Over the course of the project, students take responsibility for their work and manage a series of tasks. They troubleshoot problems and often find themselves in situations that stretch them, such as when they interview an expert, use new tech tools, or propose solutions for a community problem to an audience of adults.

Sounds like the kind of experience that will build an ideal graduate, doesn't it? Here are three such projects that developed those skills in students.

Three Powerful Projects

At DuPont Hadley Middle School in Nashville, Tennessee, 5th grade teacher Pamela Newman drew inspiration for a project from a student who had been battling brain cancer for many years. Pamela challenged her students to learn about cancer research and treatment and then plan a fund-raiser where they would display exhibits and make presentations. The project addressed standards for science, English, technology, and math. For part of their research, students connected with scientists at the Vanderbilt University Center for Science Outreach, who provided access to equipment, such as compound light microscopes. For the fund-raiser, students calculated the cost of necessary ingredients for a spaghetti dinner and invited the community. They raised $1,300 to benefit the Monroe Carell Jr. Children's Hospital.

At Maplewood High School, also in Nashville, Danette McMillan's 12th grade economics students took up a real-world issue: the lack of home ownership in their community. McMillan devised the idea for the project after she took part in a weeklong externship at Fifth Street Bank. To launch the project, students volunteered with Habitat for Humanity as the organization built a local home. The high school seniors then explored what it takes to own a home and the effects of lack of home ownership on a neighborhood. Working with staff from the bank, students conducted a community education event for parents and local residents to inform them about the benefits of owning a home and how to start the process. The students also learned about the loan approval process and went house shopping with a real estate agent, in the end producing a video that documented the project.

Teacher Al Summers and his 9th graders at St. Henry Middle School in St. Henry, Ohio, tackled the issue of water quality in an environmental science project. Student teams tested water from local waterways to identify pollutants and determine their sources. During the course of the yearlong project, students connected with professionals from Ohio State University's Agricultural Extension Agency, as well as with local farmers, to learn, for example, that phosphate runoff could be reduced by installing ditches around fields. To document their work, students created a video and wrote a class book about the water quality tests and the implications of the results. The class also compiled their data and presented them to the Lake Improvement Association. But the project didn't end there. One student asked, "Why don't we do something about it?" As a result, the class later contacted state government officials and successfully proposed an adopt-a-shoreline program for a local lake.

The Adult-World Connection

In addition to building success skills, there's another benefit to authentic projects like those described above; they expose students to the adult world.

The students who engaged in these three projects learned what it means to have to meet—or at least approach—the quality standards expected when adults plan an event, make a presentation, or gather and report data. They understood what it's like to meet real deadlines, not the arbitrary ones typically set by teachers but ones they had to meet because people were counting on them. They learned how to behave, make eye contact, and dress appropriately. They talked to adults, in person, by phone, and online, practicing Common Core standards for speaking and listening.

What's more, students got a glimpse of what it's like to be in a workplace like a science laboratory, construction site, or bank. They might have even envisioned themselves in careers as scientists, home builders, or environmental engineers.

Ready for Challenges

When students engage in project-based learning over the course of their time in school, there's an accumulating effect.

They feel empowered. They see that they can make a difference. When they see a problem in their community or the wider world, they have the confidence—and the inclination—to contribute to a solution.

When faced with a similar challenge later in life, students who have tackled rigorous projects in school often won't hesitate to step up. These are people who know how to identify problems, ask the right questions, form an effective team, and find resources. They can come up with ideas and test them, unafraid to "fail forward" until they get it right.

Two recent "ideal graduates" of high schools that used project-based learning as the dominant pedagogy gave keynote addresses at the PBL World conference last year. Katie Wynne and Victor Arellano testified to the transformative power of project-based learning.

"Project-based learning at Da Vinci Charter Academy ... did not teach me to sit quietly," Katie said. "Rather it taught me to be adaptable and embrace ambiguity, to seek out the value in others and lead inclusively, and to be confident in forging my own life and career."

Victor added: "I am not sure about what I want to study in the future, or where the world will take me. The only thing I am sure about is that the world is in desperate need of leaders: leaders who inspire, change, and work toward the improvement of society. The skills that I learned through my project-based-learning-infused education at Impact Academy will help me become that leader."

EL Online

For more on discovering what skills graduates will need for the workplace, read the online-only article "Insights from the World of Work" by Michael Kris.

Learn how younger students can participate in project-based learning in the online-only article "Children's Thinking Takes Flight" by Judy Harris Helm.

And see how an innovative project connected to 3D printing and the world of commerce energized a group of high school students, in the online-only article "When Students Take the Lead" by Eric Hardie.

The Challenges of PBL—and How to Meet Them

Project-based learning is transformational for students—and teachers, too—but it's not a quick fix. Here are some common mistakes that teachers and school leaders make, with

suggestions for avoiding them:

► **Mistake #1: Using materials that aren't truly project-based.** With the recent upsurge in interest, many purveyors of curriculum materials are claiming their wares are "project-based" when they're really "PBL-lite." Make sure to examine rigorous models of PBL. (See examples.) Project-based learning is not simply a more engaging way to "cover content." Instead, it challenges many traditional conceptions of what and how students should learn.

► **Mistake #2: Providing inadequate training and support for teachers.** A teacher attended one PBL workshop and was then handed a set of materials? That won't do the trick. It typically takes a few years for teachers to become proficient in PBL. Accordingly, schools and districts should provide long-term, ongoing professional development, guided by common principles for project design and implementation. Leaders also need to create conditions for successful and sustained uptake of PBL. This includes time for collaborative planning and reflection, building a culture that allows risk taking and innovation, block scheduling to allow for longer class periods, shared students for multisubject projects, and rethinking the use of pacing guides and assessment practices that limit a teacher's ability to use PBL.

► **Mistake #3: Diving in to all projects, all the time.** Especially when teachers are beginning their PBL journey, it's OK to start small. Try one or two projects a semester, and keep the length to about 8–10 hours of class time. For the first few projects, don't add too many subject areas, technological bells and whistles, overly ambitious student products, or complicated arrangements with outside organizations. The more teachers and students get comfortable with PBL, the more they will want to use it and tackle more complex projects. Schools might also think they're supposed to teach basic skills through PBL, but they can still keep literacy and math programs, making connections to project-related work.

► **Mistake #4: Implementing PBL on an ad hoc basis.** A school can't claim to use PBL when it's really only a few teachers, a few students, or a few projects. The promised benefits of PBL will not accumulate unless students experience high-quality projects on a regular basis throughout their school years. Project-based learning works for all students and should not be reserved for special groups or those who lucked out by getting certain teachers.

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